FLUKE®

50S & 50D

Thermometer

Users Manual

PN 1278540
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50S & 50D

Introduction

The Fluke Models 50S and 50D Thermometers (“the thermometer”) are microprocessor-based, digital thermometers designed to use external J-and K-type thermocouples (temperature probes) as temperature sensors.

Use the thermometer only as specified in this manual. Otherwise, the protection provided by the meter may be impaired.

Replacement Parts and Accessories

Accessory	Part Number
Battery, 9V (NEDA 1604, 6F22, or 006P)	696534
80PK-1 K-Type Bead Thermocouple	773135
Service Manual	802413
Holster	890298

Contacting Fluke

To order accessories, receive assistance, or locate the nearest Fluke distributor or Service Center, call:

1-888-993-5853 in USA & Canada
+31-402-678-200 in Europe
+81-3-3434-0181 in Japan
+65-738-5655 in Singapore
+1-425-446-5500 from other countries

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Visit us on the World Wide Web at: www.fluke.com

Safety Information

⚠Warning

A Warning identifies conditions and actions that pose hazards to the user. To avoid electrical shock or personal injury, follow these guidelines:

- **Before using the thermometer inspect the case. Do not use the thermometer if it appears damaged. Look for cracks or missing plastic. Pay particular attention to the insulation around the connectors.**
- **Disconnect the thermocouple(s) from the thermometer before opening the case.**
- **Replace the batteries as soon as the battery indicator (⊟) appears. The possibility of false readings can lead to personal injury.**
- **Do not use the thermometer if it operates abnormally. Protection may be impaired. When in doubt, have the thermometer serviced.**
- **Do not operate the thermometer around explosive gas, vapor, or dust.**
- **Do not apply more than the rated voltage, as marked on the thermometer, between the thermocouple(s), or between any thermocouple and earth ground.**

⚠Warning (cont.)

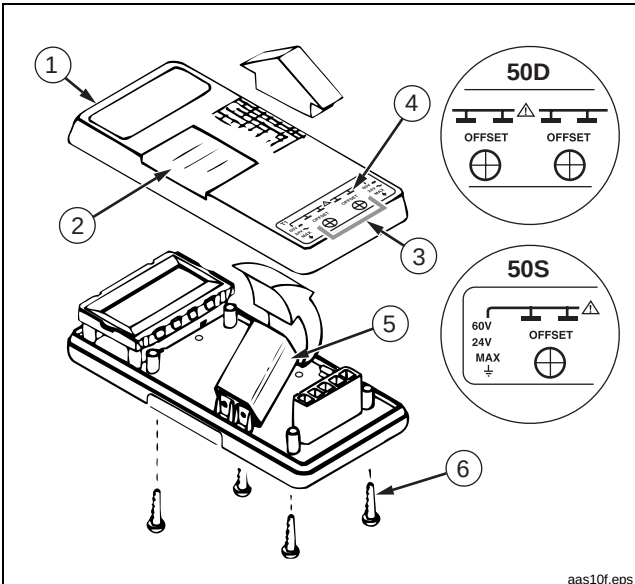
- ***Model 50D*: Measurement errors may occur if voltages on the measurement surfaces result in potentials greater than 1 V between the two thermocouples. When potential differences are anticipated between the thermocouples, use electrically insulated thermocouples.**
- **Do not operate if any voltage is present at the measurement surface.**
- **When servicing the thermometer, use only specified replacement parts.**
- **Do not use the thermometer with any part of the case or cover removed.**

Caution

To avoid damaging the thermometer or the equipment under test.

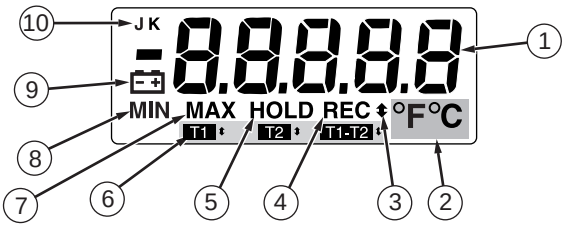
- **Use the proper thermocouples, function, and range for your thermometer.**
- **Do not attempt to recharge the batteries.**
- **To prevent explosion, do not throw batteries into a fire.**
- **Follow local laws or regulations when disposing batteries.**
- **Match the + and – polarities of the battery with the battery case.**

Components



①	Display	④	Thermocouple input(s)
②	Controls	⑤	Battery
③	OFFSET control(s)	⑥	Case screws

Display Elements



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①	Temperature display.	⑥	T1; or T2 or T1-T2 *(Model 50D)* readings are displayed.
②	Temperature units.	⑦	Maximum readings are displayed.*
③	Stored readings are displayed.*	⑧	Minimum readings are displayed.*
④	Record mode is active.*	⑨	Low battery.
⑤	Displayed readings are frozen.	⑩	Thermocouple type.

** Model 50D only.*

The display shows "- - - - -" if a thermocouple is open.

Controls

ON / OFF	Turn the thermometer on or off.
F / C	Switch between Fahrenheit (°F) and Celsius (°C).
HOLD	Freeze or unfreeze the displayed readings. When pressed during power-up, changes the thermocouple type.
RECORD*	Toggle Record mode on and off. (Stores MIN/MAX readings.)
T1*	Select the T1 thermocouple input. When pressed during power-up, **T1** changes the display resolution.
T2*	Select the T2 thermocouple input. When pressed during power-up, selects Scan mode. (The display continuously cycles between T1, T2, and T1-T2.)
T1-T2*	Select the differential temperature measurement.
VIEW*	Toggle the MIN/MAX readings stored in Record mode on and off.
OFFSET*	Optimize measurement accuracy for a thermocouple at a particular temperature.
** Model 50D only.*	

Changing to the J-Type Thermocouple

- Press **HOLD** during power-up.

Changing to Low Resolution

To select the low display resolution [1.0 °C (1.0 °F)]:

1. Turn the thermometer off.
2. Press **T1** + **ON/OFF** for 2 to 3 seconds.

   The alternate resolution remains set until the thermometer is turned off.

Adjusting the Offset

To compensate for thermocouple errors:

1. Plug the thermocouple into the input connector.
2. Place the thermocouple in a known, stable temperature environment (such as an ice bath or a dry well calibrator) and allow the readings to stabilize.
3. Simultaneously push and turn the **OFFSET** control until the display shows the correct reading.

This adjustment affects calibration.

Specifications

General

Weight	280 g (10 oz)
Dimensions (without holster)	2.8 cm × 7.5 cm × 16.6 cm (1.1 in × 3 in × 6.6 in)
Battery	Standard 9V battery (NEDA 1604, 6F22, or 006P)
Protection	Class III as defined in IEC 348, Safety Requirements for Electronic Apparatus

Environmental

Operating Temperature	0 °C to 50 °C (32 °F to 122 °F)
Storage Temperature	–40 °C to +60 °C (–40 °F to +140 °F)
Humidity	0 % to 90 %: 0 °C to 35 °C (32 °F to 95 °F) 0 % to 70 %: 0 °C to 50 °C (32 °F to 122 °F)

Electrical

Measurement Range	K-type: –200 ˚C to +1370 ˚C (–328 ˚F to +2498 ˚F) J-type: –200 ˚C to +760 ˚C (–328 ˚F to + 1400 ˚F)
Display Resolution	Low: 1.0 ˚C or 1.0 ˚F High: 0.1 ˚C or 0.2 ˚F
Measurement Accuracy	K-type: ±(0.1 % of reading + 0.7 ˚C) [±(0.1 % of reading + 1.3 ˚F)] J-type: ±(0.1 % of reading + 0.8 ˚C) [±(0.1 % of reading + 1.4 ˚F)]
Temperature Coefficient	0.01 % of reading + 0.03 ˚C (0.03 ˚F) for [ambient temperatures from +18 ˚C to 28 ˚C (+64 ˚F to 82 ˚F)]
Maximum Differential Common Mode Voltage	1 V (Maximum voltage difference between T1 and T2)
Temperature Scale	IPTS-68
Certification	CE, SP
Applicable Standards	NBS 125, IEC 584
Accuracy is specified for ambient temperatures between 18 oC (64 oF) and 28 oC (82 oF) for a period of 1 year. The above specifications do not include thermocouple error. Accuracy is unspecified when the input lead length is resonant with the interfering frequency.	